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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/625,667	07/24/2003	John Lawrence Jordan	3437-Z	8923

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EXAMINER	
MAIS, MARK A	

ART UNIT	PAPER NUMBER
2616	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/625,667	JORDAN ET AL.	
	Examiner	Art Unit	
	Mark A. Mais	2616	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-23* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-23* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *24 July 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *4/13/04; 1/11/05*.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Information Disclosure Statement

1. The information disclosure statements (IDSs) were filed on April 13, 2004 and January 11, 2005. The submission is in compliance with the provisions of 37 C.F.R. 1.97. According, the examiner considered the IDSs.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1-23 are rejected under 35 U.S.C. 102(b) as being anticipated by Passint et al. (USP 6,101,181).

4. With regard to claim 1, Passint et al. discloses a cluster-based router **[multiprocessor system with a plurality of processing nodes, col. 3, lines 45-47]** comprising:

(a) a plurality of equivalent interconnected router cluster nodes, the routing capacity of the cluster router increasing substantially O(N) with the number N of router cluster nodes in the cluster router **[multiprocessor system with a plurality of processing nodes, col. 3, lines 45-47]**;

(b) a plurality of cluster router internal links interconnecting router cluster nodes forming an intra-connection network ensuring a high path diversity in providing resiliency to failures **[an acrylic network is deadlock free, col. 2, lines 64 to col. 3, line 16]**;

(c) each router cluster node having a group of cluster router external links enabling packet exchange with a plurality of external communication network nodes **[each router has numerous input/output ports for receiving/sending messages, col. 3, lines 50-54]**; and

(d) each router cluster node operating in accordance with a provisioned router-cluster-node-centric configuration to effect distributed routing of the conveyed packets, the equivalency between the router cluster nodes providing a scalable cluster router **[torus networks are formed which are scaleable in all n dimensions, col. 1, line 66 to col. 2, line 15; Fig. 8 shows a 6D hypercube topology multiprocessor system, col. 8, lines 19-31]**.

5. With regard to claim 12, Passint et al. discloses a router cluster node of a plurality of router cluster nodes interconnected in a cluster router **[multiprocessor system with a plurality of processing nodes, col. 3, lines 45-47]**, the router cluster node comprising:

(a) a plurality of cluster router internal interconnecting links connected thereto, the internal interconnecting links enabling the exchange of packets with adjacent router cluster nodes in the cluster router **[each router has numerous input/output ports for receiving/sending messages, col. 3, lines 50-54]**;

(b) at least one cluster router external link connected thereto, the at least one external link enabling exchange of packets between external communications network nodes and the cluster router **[each router has numerous input/output ports for receiving/sending messages, col. 3, lines 50-54]**; and

(c) a router-cluster-node-centric configuration to effect distributed routing of the conveyed packets **[torus networks are formed which are scaleable in all n dimensions, col. 1, line 66 to col. 2, line 15; Fig. 8 shows a 6D hypercube topology multiprocessor system, col. 8, lines 19-31]**,

the equivalency between router cluster nodes in the cluster router providing a scalable router **[Fig. 8 shows a 6D hypercube topology multiprocessor system, col. 8, lines 19-31; each cluster is equivalent forming a symmetric scaleable cluster]**.

6. With regard to claim 18, Passint et al. discloses a router-cluster-node-centric configuration enabling the provision of a distributed packet routing response in a cluster router having a plurality of router cluster nodes **[multiprocessor system with a plurality of processing nodes, col. 3, lines 45-47]**, the configuration comprising:

(a) a plurality of routing functional blocks **[each router has numerous input/output ports for receiving/sending messages, col. 3, lines 50-54; torus networks are formed which**

are scaleable in all n dimensions, col. 1, line 66 to col. 2, line 15; Fig. 8 shows a 6D hypercube topology multiprocessor system, col. 8, lines 19-31]; and

(b) at least one cluster-node-centric packet processing flow, via the plurality of routing functional blocks, to effect routing of packets received at the cluster router employing one of

a single router cluster node and

a group of router cluster nodes **[Fig. 8 shows a 6D hypercube topology multiprocessor system, col. 8, lines 19-31]**.

7. With regard to claim 19, Passint et al. discloses that the router-cluster-node-centric configuration claimed in claim 18, further comprising:

(a) an entry-and-routing processing packet processing flow specification; (b) a transit packet processing flow specification; and (c) an exit packet processing packet processing flow specification **[the global routing table (external addressing) and the local routing tables (internal addressing) provide both processor and link functionality (operating status) reporting, col. 13, line 20 to col. 14, line 34; for example, fault avoidance is provided (col. 13, lines 38-40)]**,

the packet processing flow specifications enabling a received packet to undergo entry and routing processing at an entry router cluster node, optionally transit via at least one intermediary router cluster node, and undergo exit processing at an exit router cluster node **[each router has numerous input/output ports for receiving/sending messages, col. 3, lines 50-54; torus networks are formed which are scaleable in all n dimensions, col. 1, line 66 to col. 2, line 15; Fig. 8 shows a 6D hypercube topology multiprocessor system, col. 8, lines 19-31; Fig. 9**

shows a system where each cluster has six links to six neighboring nodes, col. 8, lines 52-58].

8. With regard to claims 2 and 13, Passint et al. discloses that the router-cluster-node-centric configuration further comprises routing functional blocks and specifies packet processing flows between the routing functional blocks effecting packet routing employing one of:

a single router cluster node, and

a sequence of router cluster nodes **[Fig. 8 shows a 6D hypercube topology multiprocessor system, col. 8, lines 19-31]**.

9. With regard to claims 3 and 14, Passint et al. discloses that each router cluster node comprises a personal computer platform providing flexibility and cost savings in the development, deployment, maintenance, and expandability of the cluster router **[a desktop computer system (interpreted as a personal computer), col. 8, lines 33-34]**.

10. With regard to claims 4 and 15, Passint et al. discloses that the intra-connection network further comprises an n dimensional toroidal topology , wherein 2*n internal links interconnect each router cluster node with 2*n adjacent neighboring router cluster nodes; the routing capacity of the cluster router being increased substantially linearly by adding an n-1 dimensional slice of router cluster nodes to the cluster router **[torus networks are formed which are scaleable in all n dimensions, col. 1, line 66 to col. 2, line 15; Fig. 8 shows a 6D hypercube topology multiprocessor system, col. 8, lines 19-31]**.

11. With regard to claim 5, Passint et al. discloses that the intra-connection network comprises a three dimensional toroidal topology, wherein six internal links interconnect each router cluster node with six adjacent neighboring router cluster nodes **[torus networks are formed which are scaleable in all n dimensions, col. 1, line 66 to col. 2, line 15; Fig. 9 shows a system where each cluster has six links to six neighboring nodes, col. 8, lines 52-58]**.

12. With regard to claim 6, Passint et al. discloses that the intra-connection network further comprises one of

unidirectional and

bi-directional internal interconnecting links **[bidirectional links, input/output ports for receiving/ sending messages, col. 3, lines 52-54]**.

13. With regard to claim 7, Passint et al. discloses that the a router cluster node designated as a management node, should a management node designated router cluster node fail, designating another router cluster node as a management node without making changes to the cluster router infrastructure **[with torus/hypercube topologies, multiple available paths allow the system to bypass broken processors or links, col. 19, line 50 to col. 20, line 13]**.

14. With regard to claims 8, 16, and 17, Passint et al. discloses that (a) at least one management node **[with torus/hypercube topologies, multiple available paths allow the system to bypass broken processors or links, col. 19, line 50 to col. 20, line 13; each router is interpreted as a**

management node **<u>when</u>** **it is routing a message (claim 17); thus, it must route the message to the correct destination despite broken processors or links]**; and

(b) a plurality of management links interconnecting the at least one management node with the plurality of router cluster nodes **[Fig. 9 shows a system where each cluster has six links to six neighboring nodes, col. 8, lines 52-58 (claim 16)]** and enabling one of

out-of-band configuration deployment to each router cluster node **[side-band signaling, col. 12, lines 12-22]**,

router cluster node initialization, and

reporting functionality **[the global routing table and the local routing tables provide both processor and link functionality (operating status) reporting, col. 13, line 20 to col. 14, line 34; for example, fault avoidance is provided (col. 13, lines 38-40)]**;

employing the plurality of management links reducing an in-band cluster router management overhead **[e.g., one processor decides which direction to take by attaching the new route to the packet header used on the next router (and, thus, reducing overhead), col. 14, lines 30-34; moreover, the routing tables cannot be used for congestion control—further reducing overhead (col. 13, line 40)]**.

15. With regard to claim 9, Passint et al. discloses that the plurality of management links from one of a star **[star, mesh, ring, etc. col. 1, lines 433-45]** and

a bus topology .

16. With regard to claims 10, 20, and 21, Passint et al. discloses a cluster router internal addressing process dynamically determining router cluster node addressing **[the global routing table (external addressing) and the local routing tables (internal tag/addressing; especially for a series of same-tagged/addressed packets (claim 21)) provide both processor and link functionality (operating status) reporting, col. 13, line 20 to col. 14, line 34; for example, fault avoidance is provided (col. 13, lines 38-40)]**.

17. With regard to claim 11, Passint et al. discloses a cluster router external addressing process dynamically determining a cluster router address **[the global routing table (external addressing) and the local routing tables (internal addressing) provide both processor and link functionality (operating status) reporting, col. 13, line 20 to col. 14, line 34; for example, fault avoidance is provided (col. 13, lines 38-40)]**.

18. With regard to claim 22, Passint et al. discloses that each tag comprises a combination of:

an optional packet header **[sideband signaling, col. 12, lines 12-22]**,

a packet trailer **[tail micropackets, col. 12, lines 5-8]**, and

an additional header encapsulating the associated packet having cluster router relevance only **[the router tries to match the global ID first to look up in the global table; if unsuccessful, it looks to the local router table (interpreted as encapsulated within one another), col. 15, lines 41-55]**.

19. With regard to claim 23, Passint et al. discloses that each tag holds a tag time-to-live specification decremented while the associated packet propagates via router cluster nodes in the cluster, the packet being discarded when the time-to-live specification is zero and the packet has not reached a corresponding exit router cluster node thereby reducing transport overheads **[once the aging limit is reached (i.e., the message will be deleted), col. 12, lines 23-32]**.

Conclusion

20. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

(a) Passint et al. (USP 5,970,232), Router table lookup mechanism.

(b) Bestvaros et al. (USP 6,370,584), Distributed routing.

(c) Antonov (USP 6,044,080), Scaleable parallel packet router.

(d) Deneroff et al. (USP 6,973,559), Scaleable hypercube multiprocessor network for massive parallel processing.

(e) Bommareddy et al. (USP 6,779,039), System and method for routing message traffic suing a cluster of routers sharing a single logical IP address distinct from unique IP addresses of the routers.

(f) Lee et al. (USP 5,224,100), Routing technique for a hierarchical interprocessor-communication network between massively-parallel processors.

21. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mark A. Mais whose telephone number is 572-272-3138. The examiner can normally be reached on M-Th 5am-4pm.

22. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Seema Rao can be reached on 571-272-3174. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

23. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

MAM
April 18, 2007

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